PARCA Root Cause Analysis: Expeditionary Combat Support System Program

September 17, 2013

Mark Husband
Senior Advisor for Root Cause Analyses
OSD/AT&L/PARCA
571-256-1686
david.m.husband.civ@mail.mil

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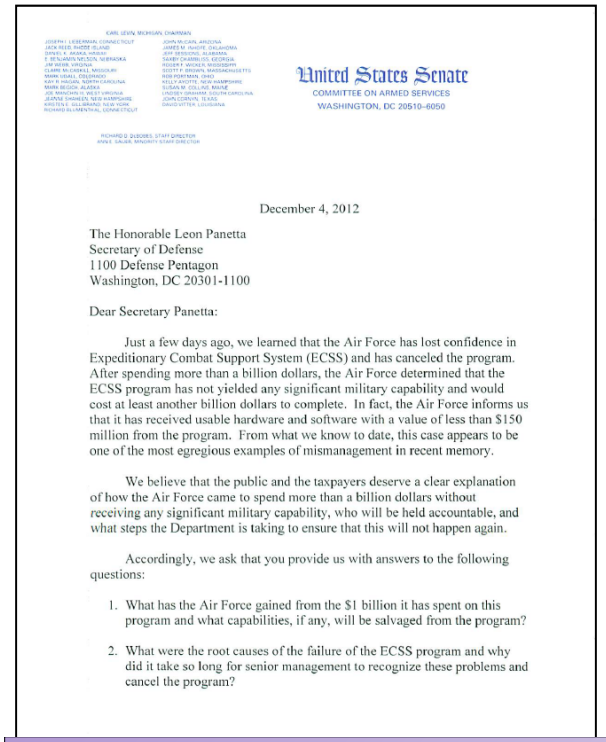
Background

- ECSS was a USAF MAIS ACAT IAM program
  - Objective: Transform AF's supply chain & logistics processes
    - Serve over 250,000 users at 186+ installations
    - Replace 420 legacy systems
  - MS A approved Aug 31, 2005
  - Terminated Dec 11, 2012 after spending ~$1.1B
- Senators Levin and McCain, Chair and Ranking Members of the SASC respectively, sent Dec 4, 2012 letter to SECDEF asking questions on ECSS termination
- USD(AT&L) directed PARCA to perform a root cause analysis on ECSS program failure

Senators' questions:



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United States Senate
COMMITTEE ON ARMED SERVICES
WASHINGTON, DC 20510-6050

December 4, 2012

The Honorable Leon Panetta
Secretary of Defense
1100 Defense Pentagon
Washington, DC 20301-1100

Dear Secretary Panetta:

Just a few days ago, we learned that the Air Force has lost confidence in Expeditionary Combat Support System (ECSS) and has canceled the program. After spending more than a billion dollars, the Air Force determined that the ECSS program has not yielded any significant military capability and would cost at least another billion dollars to complete. In fact, the Air Force informs us that it has received usable hardware and software with a value of less than $150 million from the program. From what we know to date, this case appears to be one of the most egregious examples of mismanagement in recent memory.

We believe that the public and the taxpayers deserve a clear explanation of how the Air Force came to spend more than a billion dollars without receiving any significant military capability, who will be held accountable, and what steps the Department is taking to ensure that this will not happen again.

Accordingly, we ask that you provide us with answers to the following questions:

1. What has the Air Force gained from the $1 billion it has spent on this program and what capabilities, if any, will be salvaged from the program?

2. What were the root causes of the failure of the ECSS program and why did it take so long for senior management to recognize these problems and cancel the program?

3. Why were previous efforts to restructure the ECSS program ineffective, and why did it take so long for senior management to recognize that they had been ineffective?

4. What changes will the Department make in the way that it manages its procurement of its other enterprise resource planning (ERP) programs to avoid similar problems in the future? In particular, what steps will the Department take to ensure: (1) appropriate software selection; (2) adequate government ERP program management skills; (3) consistency in ERP acquisition processes; and (4) an infrastructure able to support ERP performance needs?

5. What role did ineffective business process re-engineering (BPR) have in the problems the Air Force experienced with ECSS and how is this issue being addressed for future ERP programs?

6. What steps will the Department take to ensure that the prime contractor's failure to perform as required is appropriately considered as past performance in connection with future DOD contract award decisions?

7. What steps has the Department taken to review its other ERP programs in light of this experience and to ensure that they are not suffering from problems similar to those experienced by ECSS?

8. What options is the Air Force looking at to replace ECSS and how much are these options likely to cost? When will a comprehensive plan be in place?

9. In the absence of ECSS, how does the Air Force intend to meet the original objectives of ECSS and meet the 2014 and 2017 audit-readiness deadlines?

10. If the Air Force is planning to rely on legacy systems as part of its mitigation approach, what steps is the Department taking to identify and assess these legacy systems to determine what modifications (including manual workarounds) will need to be implemented and when will the Department have a timeline in place for implementing these corrective actions?

Thank you for your attention to this important matter.

Sincerely,

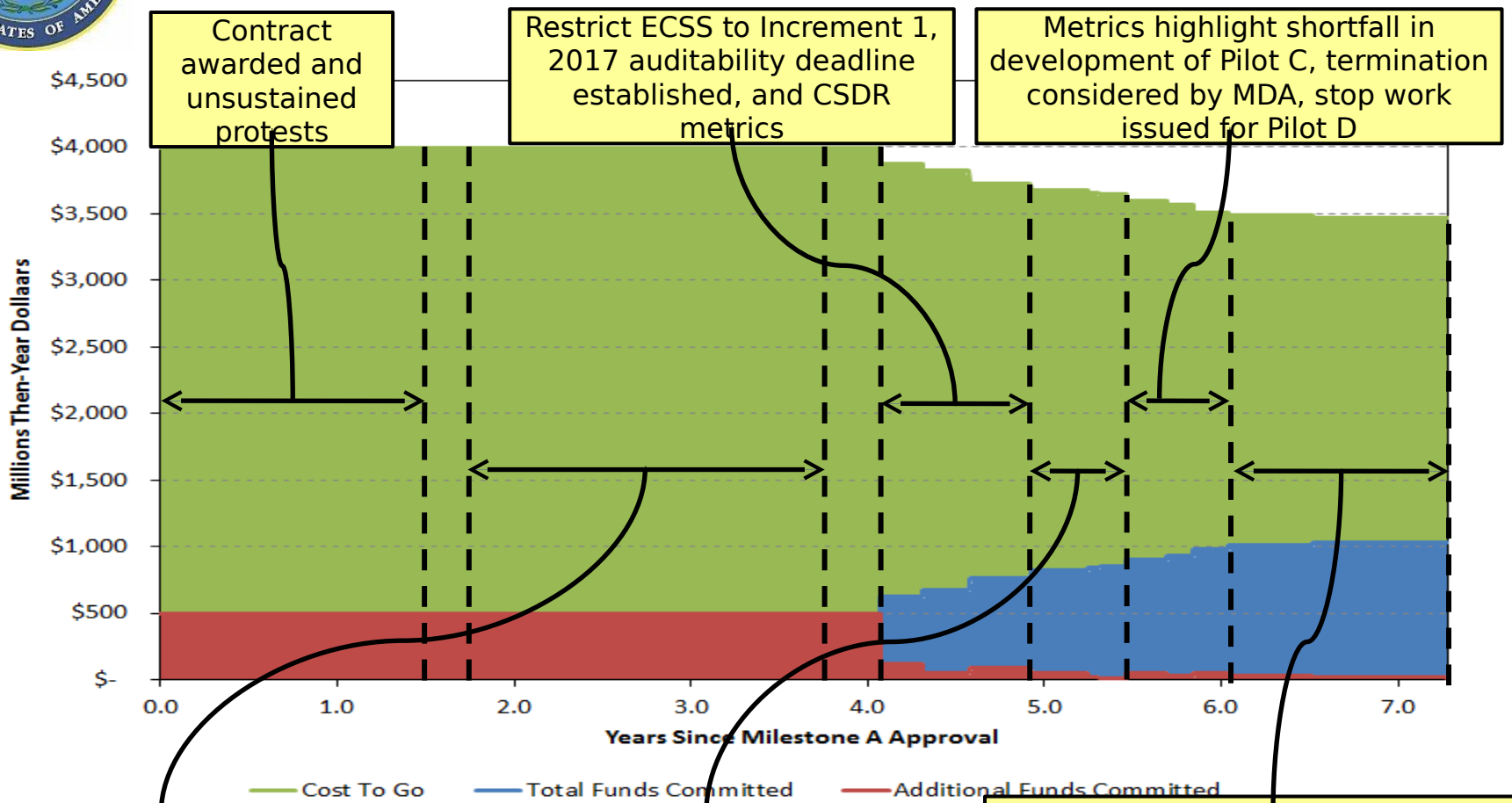
John McCain
Ranking Member

Carl Levin
Chairman

PARCA

2. What were the root causes of the failure of the ECSS program and why did it take so long for senior management to recognize these problems and cancel the program?

ECSS Program Timeline


Contract awarded and unsustained protests
Restrict ECSS to Increment 1, 2017 auditability deadline established, and CSDR metrics
Metrics highlight shortfall in development of Pilot C, termination considered by MDA, stop work issued for Pilot D
$4,500
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$-
Millions Then-Year Dollaars
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
Years Since Milestone A Approval
Cost To Go
Total Funds Committed
Additional Funds Committed
PDR effort, tech issues, addition of LogFins, contract restructured, and PM replaced
Critical change breach, Increment 1 broken into 3 then 4 pilots, and program metrics established
$1 B increase in LCCE and satisfying FIAR deadline requires legacy systems, Pilots C and D terminated, Increment 1 Terminated

By end of the Critical Change process 87% of the eventual $1035 M spent on ECSS was committed to the program

ECSS Root Causes

WSARA categories

Inception Issues	
Unrealistic performance expectations	X
Unrealistic baseline estimates for cost or schedule	
Immature technologies or excessive manufacturing or integration risk	
Other	
Execution Issues	
Unanticipated design, engineering, manufacturing or technology integration issues arising during program performance	
Changes in procurement quantity	
Inadequate program funding or funding instability	
Poor performance by government or contractor personnel responsible for	X

PARCA's findings

- Inception issue:
  - Failure to understand "As-Is" and "To-Be" architectures
- Execution issues:
  - Outsourcing major functions to System Integrator contractor
  - Failing to apply COTS-based SW acquisition strategy
  - Failing to adequately collect and assess metrics

“As-is” and “To-be” architectures

- Fundamental root cause:

  The Air Force did not adequately understand, define and document its current “as-is” business processes, nor did it internally understand and define the new “to-be” business processes it sought to implement across its enterprise.

- Enterprise Resource Planning Systems (ERP)
  - You aren’t just purchasing a SW application or IT system
  - You are implementing a new set of business processes

Outsourcing to Systems Integrator

- Acquisition strategy relied on System Integrator contractor
  - Strategy is predicated on stable requirements and known costs
  - Requirements development, translation and allocation is a government function that shouldn't be "outsourced"
  - CAPE ICE: "Perverse incentives for contractor performance, particularly for system integrator in creating the custom solution."
- SI lacked experience with ORACLE ERP software
  - PEO engaged with SI contractor leadership in 2009 on lack of SW expertise

Failure to apply COTS solution

- Insufficient focus on Business Process Re-engineering
  - ECSS was predicated on logistics community adopting COTS processes rather than customizing software to user processes
  - Insufficient BPR resulted in continuous introduction of unplanned content
  - Should have focused on user acceptance of COTS processes and interoperability with external systems while ensuring mission effectiveness
  - Continuous shifting of content between pilots, releases and increments
  - Constantly changing SI contract terms (32 different Performance Work Statements; ~160 contract modifications; cascading CLIN structure requiring continuous changes as work slipped)

Failure to collect & assess metrics

- Ineffective Integrated Master Schedule and EVM
  - PMO: "IMS provided poor visibility of external dependencies…manual integration / poor reliability…and lacked critical path awareness"
  - EVM was ineffectively applied: while on contract, ACWP was equal to BCWP every contract period; EVM was eventually removed from contract
  - PMO: metrics were "not integrated, missing objective trending, had inadequate drill-down, and no critical path"
- Effective metrics not implemented until Oct, 2010 Critical Change
  - Quickly revealed that restructured program still could not meet benchmarks

Symptoms and Consequences

- Inception issues:
  - Unrealistic cost or schedule baseline estimates
    - Never formally baselined: Service Cost Positions were created for MS A in 2005 and for planned MS B in 2009
  - Immature technologies or excessive manufacturing risk
    - Integration issue early in program with proposed software
  - Other matters
    - Inappropriate FFP contract vehicle
- Execution issues:
  - Unanticipated integration issues
    - Increased emphasis on ECSS's role in audit compliance
  - Other matters
    - Ambiguity about costs and benefits of the various ECSS increments

Why it took “so long” to recognize problems / cancel program

- Decision Traps
  - Sunk Cost; Framing; Status Quo; Optimism Bias
- Restructure Efforts
  - New program manager
  - Breaking of content into more manageable increments
  - Implementing and assessing metrics
- Consequences of termination
  - USAF unmet requirements; cost of legacy systems
  - Congressional and private sector interests

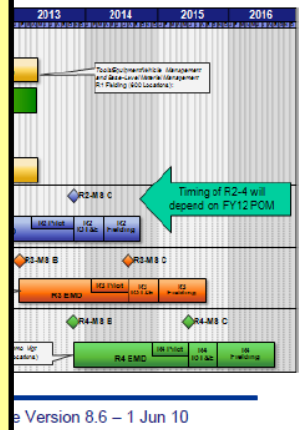
Ambiguous costs vs. benefits

ECSS Increment 1 was to provide only $677 M in gross savings while estimated to cost $4.5 B.

ECSS Increments 2-4 had not been costed, were unfunded, and were mandated to be separate programs per 2009 ADM, but were projected to provide 95% of the $12.8 B estimated savings.

ECSS Benefit Recognition

Estimated that ECSS will drive approximately $12.3B in benefits for the AF, Air Force Reserve (AFR), and Air National Guard (ANG) over its life cycle



Version 8.6 – 1 Jun 10

All figures in Millions (USD)

Specific Supporting Examples		TOTAL ECSS PROGRAM		
Benefit #	O&M Benefit	Low	Likely	High
1	Fewer Spares / Equipment Needed (MSD spend)	$ 4,221.39	$ 7,387.42	$ 8,442.77
1	Inventory Holding Costs	$ 890.99	$ 1,484.98	$ 2,969.97
2	Fewer Spares / Equipment Moved	$ 6.78	$ 9.64	$ 14.28
7	Better Financial Management	$ 0.50	$ 0.60	$ 1.24
10	Less Man-Hours	$ 95.08	$ 142.62	$ 285.24
	Supply Chain Sub Total	**$ 5,214.74**	**$ 9,025.27**	**$ 11,713.49**
	Legacy IT - Compliance Modernization	$ 520.00	$ 520.00	$ 520.00
	Legacy IT Sustainment	$ 3,294.17	$ 3,294.17	$ 3,294.17
	Legacy IT Sub Total	**$ 3,814.17**	**$ 3,814.17**	**$ 3,814.17**
	Total	**$ 9,028.91**	**$ 12,839.43**	**$ 15,527.66**

values calculated in base-year dollars, with no adjustments for inflation

- Deployment (FD) + 6 months
- Logistic savings begin to accrue in the FY following FD

$677M -- Recognition of R1 Benefits (FY14 – FY23) (IT = $493M & Log = $185M)

$2839M -- Recognition of R2 Benefits (FY15 – FY24) (IT = $1055M & Log = $1784M)

$5433M -- Recognition of R3 Benefits (FY16 – FY25) (IT = $1106M & Log = $4327M)

$3889M -- Recognition of R4 Benefits (FY17 – FY26) (IT = $1160M & Log = $2729M)

The majority of these savings will come from reductions in supply chain spending and in inventory holding costs.

FY 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026

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xpeditionary Combat Support System (ECSS) MDA Program Review 5 Jan 2011

Lessons / Conclusions

- Enterprise Resource Planning implementations are difficult for any enterprise; they require:
  - A clear understanding of relevant business processes, both current and future
  - Governance that enforces Business Process Re-engineering and adherence to the COTS-based Acquisition Strategy
  - Astute management and situational awareness of execution status
  - Significant and continuous interaction between developers and users
  - Strong focus on transition plan—both technical and cultural
  - A software product that can fulfill the enterprise's needs and the

1. **Must: Define and Understand "As is" and "To Be" processes**
2. **Must: Have coherent plan for governance of program and data**
3. **Must: Focus on Transition Plan; "Big Dig" analogy**
4. **Must Not: Customize Unless**

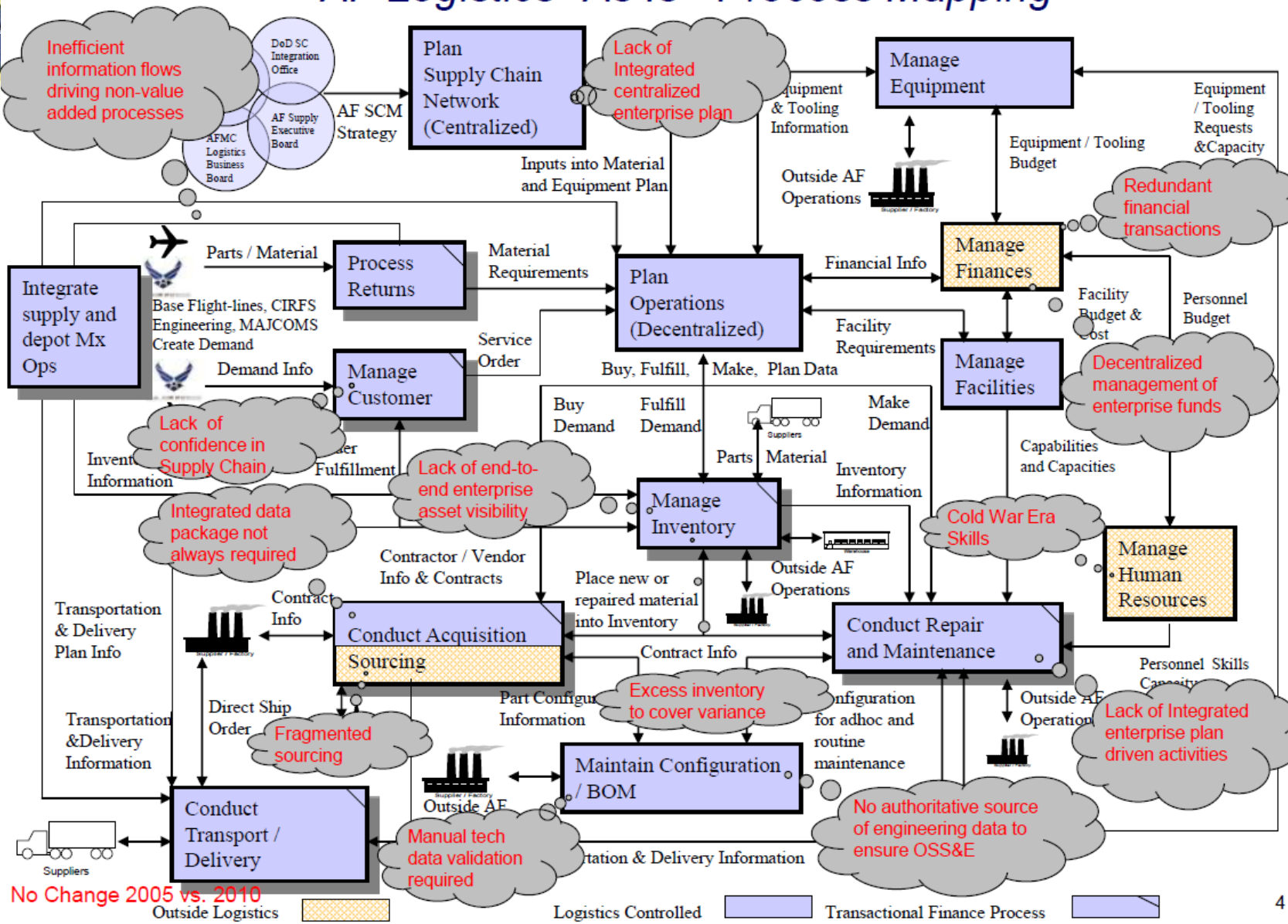
BACKUP
SUPPORTING EVIDENCE

U.S. AIR FORCE

ECSS Strategy

- Not an IT replacement for today's systems … "Transform" the U.S. Air Force's global supply chain and logistics processes:
  - Leverages commercial best practices from Aerospace and Defense and other relevant industries
  - Utilizes capabilities that exist within COTS Enterprise Resource Planning (ERP) to the fullest extent possible
  - Changes business processes, personnel roles, and organizational structures across the AF Supply Chain community
- Includes:
  - 186+ installations globally… 250,000 users (40K - 1st release)
  - Replaces 240+ Legacy Systems AND changes processes
- Delivering capability incrementally – more manageable levels of change + accrue benefits sooner
  - Release 1 = Tools/Equip/Vehicle Mgt & Base-Level Materiel Mgt
  - Release 2 = Enterprise Planning & Materiel Mgt
  - Release 3 = Heavy Maintenance & Planning
  - Release 4 = Flight Line Maintenance & Ammunition Mgt

AF Logistics "As Is" Process Mapping



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ECSS Chronology

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